Strategies for Coping with Stormwater

Watershed Resources Fact Sheet Series

#1: Why Watershed Conservation?

#2: Nonpoint Source Water Pollution

#3: Impacts of Development on Waterways

#4: Strategies for Coping with Stormwater

#5: How to Get Started: Protecting Your Community Water Resources

#6: Asking the Right Questions: Raising the Issue of Stormwater at a Public Meeting

#7: Reviewing Site Plans for Stormwater Management

#8: Conservation Subdivisions: A Better Way to Protect Water Quality, Retain Wildlife and Preserve Regional Character

#9: Carving Up the Landscape: Habitat Fragmentation and What To Do About It

#10: Flooding and Floodplain Development

#11: Special Landscapes: How to Identify and Care for Them

#12: Websites and Other Helpful Resources

As development becomes more intense, so does the amount of stormwater. A good indicator of the intensity of development in an area is the amount of impervious surface (asphalt, concrete and rooftops). Studies show that the more impervious surfaces in a watershed, the more likely the watershed's streams and lakes will become seriously damaged. To protect water resources, local officials should first consider the location, extent, drainage and maintenance of impervious surfaces. The problem can be effectively addressed by three steps: **natural resource-based planning, environmentally sound site design** and **use of best management practices.**

The Problem

Development affects the amount and quality of stormwater runoff and, in turn, the watershed and the watercourses. The volume and velocity of runoff increases as land is replaced with asphalt, concrete and rooftops. The result is flooding, erosion and alterations in stream form and function (see *Fact Sheet #3: Impacts of Development on Waterways*). The impervious surfaces prevent infiltration and the natural processing of nutrients, sediment, pathogens and other contaminants. As a result, surface water quality becomes degraded.

RIVERS AND STREAMS connect communities and landscapes into watersheds. This series of fact sheets is designed to help you address the effects of development on our water resources and learn the steps communities can take to reduce those impacts. Communities are affected by the activities of their neighbors—upstream or downstream, uphill or downhill—in a common watershed. Working together, watershed neighbors can find solutions to work for everyone.

Scientific research now finds a direct relationship between the amount of impervious surface in a watershed and the water quality of the watershed's streams and lakes. Many studies reveal that without some kind of stormwater management, the quality of stream water becomes increasingly impacted as impervious surface area in the watershed exceeds 15 percent. In a highly sensitive stream, the stream can begin to degrade when as little as 8 percent of the watershed area has impervious cover. A watershed with as little as 20 percent imperviousness can render a stream lifeless (Schueler, et al., 1992).

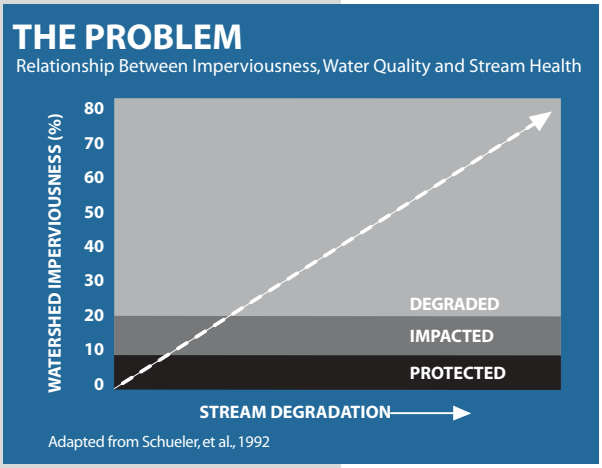
What Communities Can Do

Pavement is an unavoidable fact of modern life, but there are still many options to consider. A county or municipality wanting to reduce water quality impacts of existing or future development can use a three-tiered strategy to **plan, minimize** and **mitigate** effects.

1. Integrate Natural Resources Into Your Community Plan

Remember, preventing pollution by wise planning is by far the least expensive and most effective way to protect your community's waterways. A working knowledge of your community's natural resources is critical to guide appropriate development. The first step is a natural resource inventory. Identify important natural resources and the protection they need. Use this information as a framework for evaluating impacts from proposed or existing developments. Include these priorities in your community plans and procedures (see *Fact Sheet #5: How to Get Started*).

Apply broad resource protection strategies at the community or watershed level such as buffer zone and setback requirements—strategies that are now commonly used. To address



If more than 20 percent of a watershed is made up of impervious surfaces (roads, roofs and parking lots), then the stream will be degraded.

increases in impervious surface cover, begin with a budget approach to set an overall limit for key areas. When a site goes above that limit, compensate by decreasing the cover on another site (or some other acceptable trade-off). This technique is especially appropriate in a watershed where potential future growth threatens critical water resources.

2. Minimize Impacts Through Site Design

Local officials, designers and builders can work together to reduce nonpoint source pollution during the site planning process. While evaluating site plans, look for ways to minimize impervious areas, disruption of natural drainage and removal of vegetation. Consider designing conservation subdivisions to reduce the total area of paved surfaces and increase the amount and natural functioning of open space. The sizes of sidewalks, roads and parking lots can be minimized without loss of function. Brick, crushed stone or pervious pavement is often a viable alternative in low traffic areas. Instead of curbing and piping, look at directing the drainage to vegetated swales. Rooftop runoff can be directed to a rain garden.

Encourage designs to reduce grading and filling and retain natural features. These designs protect waterways and often promote tree survival, plus they are less expensive and more pleasing to the eye. If not allowed by local zoning ordinances, encourage the adoption of ordinances to allow these techniques.

3. Mitigate Unavoidable Impacts By Using BMPs (Best Management Practices)

Best management practices include a whole range of methods designed to prevent, reduce or treat stormwater runoff. Some involve changes in design, while other practices require construction. Consider the site when choosing the correct BMP. There are a number of agencies and publications to help with guidance (see *Fact Sheet #5: How to Get Started*). Here are some basic BMP concepts to keep in mind:

Slow that stormwater. During site design, integrated systems of grassed waterways, constructed wetlands and small basins slow the stormwater, allowing infiltration and water cleansing–plus, they provide attractive, functional landscape features. These systems are replacing traditional detention basins (which slow and hold stormwater before releasing it) and retention basins (which hold the water permanently until it infiltrates into the ground). Pollutants are removed as particles settle and chemical and biological interactions occur in standing water, plants or the soil. BMPs must be correctly designed, installed and maintained to work properly. Phased grading and other BMPs during construction can help minimize runoff from site work and help retention and detention basins function more effectively.

Avoid direct connections. Break up the rapid flow of nonpoint source pollution by using vegetated swales, filter strips or other forms of vegetative BMPs to replace curbing and piped drainage in a site design. In many cases, these methods work best when combined with structural BMPs like detention ponds.

Ensure regular maintenance. Most structural BMPs require regular maintenance for peak efficiency in removing pollutants. Maintenance ranges from the frequent, but simple (sweeping parking lots and cleaning stormdrains) to the infrequent, but complex (sediment removal from detention or retention ponds). In all cases, budget and plan for regular maintenance. Maintenance is decreased when sediment is stopped at the source by using several BMPs in a series.

Don't forget the two Es—enforcement and education. Most importantly, make sure that contractors are following through on agreed-upon designs and methods. Don't underestimate projects like stormdrain stenciling and hazardous waste disposal days to raise public awareness, reduce pollution and help create support for all your community's water protection activities.

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